

Examining Relationships

Checkpoint 1

Question (1)

A store asked 250 of its customers whether they were satisfied with the service or not. The responses were also classified according to the gender of the customers. We want to study whether there is a relationship between satisfaction and gender.

A meaningful display of the data from this study would be:

A: side-by-side boxplots

B: a pie chart

C: a histogram

D: a scatterplot

E: a two-way table

Feedback

A : 0

X This is not quite right. Remember that side-by-side boxplots are a display for comparing several groups of **quantitative** data (that is, for the relationship between a categorical explanatory variable and a **quantitative** response variable). But in this exercise, both variables are categorical. Try to remember the appropriate display for categorical relationship. (e) is the correct answer.

B : 0

X This is not quite right. Remember that a pie chart is a display of a **single** variable. But in this exercise, there were **two** variables measured. Try to remember the appropriate display for the **relationship** between the two variables. (e) is the correct answer.

C : 0

X This is not quite right. Remember that a histogram is a display of a **single** variable. But in this exercise, there were **two** variables measured. Furthermore, a histogram would display a set of **quantitative** data, but in this exercise, both variables are categorical. Try to remember the appropriate display for categorical relationship. (e) is the correct answer.

D : 0

X This is not quite right. Remember that a scatterplot is a display of **quantitative** relationship (in other words, for the relationship between a **quantitative** explanatory variable and a **quantitative** response variable). But in this exercise, both variables are categorical. Try to remember the appropriate display for categorical relationship. (e) is the correct answer.

E : 10

✓ Good job! A two-way table is the appropriate display of categorical relationship (in other words, to display the relationship between a categorical explanatory variable and a categorical response variable).

Question (2)

A survey was conducted to study the relationship between the annual income of a family and the amount of money the family spends on entertainment. Data were collected from a random sample of 280 families from a certain metropolitan area.

A meaningful graphical display of these data would be:

- A:** side-by-side boxplots
- B:** a pie chart
- C:** a stemplot
- D:** a scatterplot
- E:** a contingency table

Feedback

A : 0

- ✗ This is not quite right. Remember that side-by-side boxplots are a display for comparing quantitative data for several **categories** or groups (in other words, for the relationship between a **categorical** explanatory variable and a quantitative response variable). But in this exercise, both variables are **quantitative**. Try to remember the appropriate display for quantitative relationship. (d) is the correct answer.

B : 0

- ✗ This is not quite right. Remember that a pie chart is a display of a **single** variable. But in this exercise, there were **two** variables measured. Furthermore, a pie chart would display **categorical** data, but in this exercise, both variables are quantitative. Try to remember the appropriate display for quantitative relationship. (d) is the correct answer.

C : 0

- ✗ This is not quite right. Remember that a stemplot is a display of a **single** variable. But in this exercise, there were **two** variables measured. Try to remember the appropriate display for the **relationship** between the two variables. (d) is the correct answer.

D : 10

- ✓ Good job! A scatterplot is the appropriate display of quantitative relationship (in other words, to display the relationship between a quantitative explanatory variable and a quantitative response variable).

E : 0

- ✗ This is not quite right. Remember that a two-way table is a display of **categorical** relationship (in other words, of the relationship between a **categorical** explanatory variable and a **categorical** response variable). But in this exercise, both variables are quantitative. Try to remember the appropriate display for quantitative relationship. (d) is the correct answer.

Question (3)

In order to study whether IQ level is related to birth order, data were collected from a sample of 540 students on their birth order (Oldest/In Between/Youngest) and their score on an IQ test. The data collected in this study would be best displayed using:

- A:** a pie chart
- B:** a histogram
- C:** a scatterplot
- D:** a two-way table
- E:** side-by-side boxplots

Feedback

A : 0

- X** This is not quite right. Remember that a pie graph is a display of a **single** variable. But in this exercise, there were **two** variables measured. Try to remember the appropriate display for the **relationship** between the two variables. (e) is the correct answer.

B : 0

- X** This is not quite right. Remember that a histogram is a display of a **single** variable. But in this exercise, there were **two** variables measured. Try to remember the appropriate display for the **relationship** between the two variables. (e) is the correct answer.

C : 0

- X** This is not quite right. Remember that a scatterplot is a display of relationship between two variables which are **both quantitative**. But in this exercise, only one of the two variables is quantitative. Try to remember the appropriate display for the relationship between the two variables in the exercise, based on their type (quantitative or categorical) and their role (explanatory or response). (e) is the correct answer.

D : 0

- X** This is not quite right. Remember that a two-way table is a display of relationship between two variables which are **both categorical**. But in this exercise, only one of the two variables

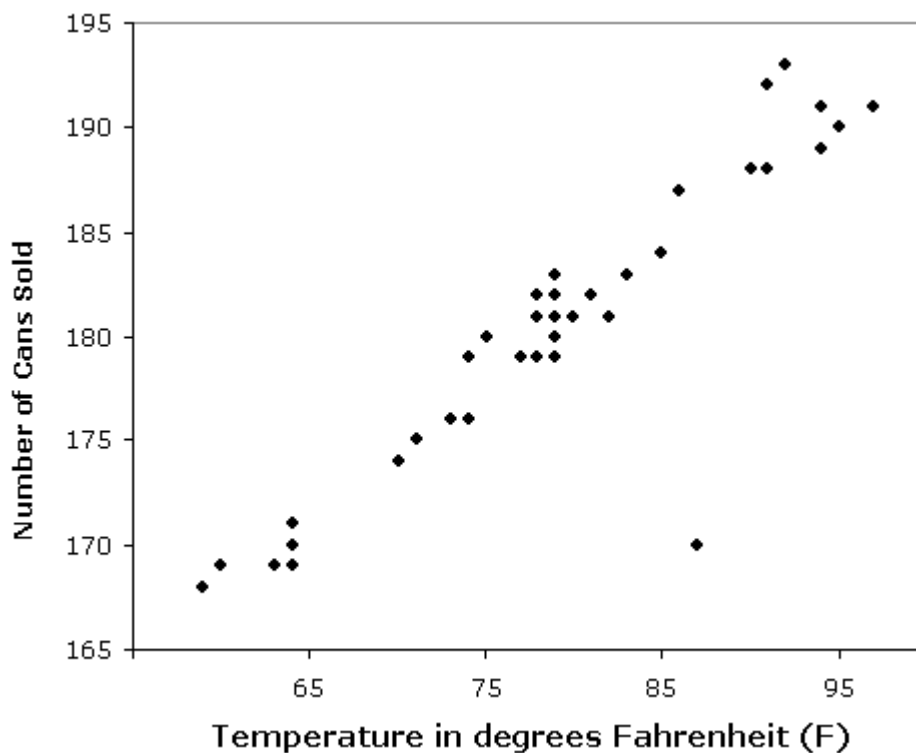
X is categorical. Try to remember the appropriate display for the relationship between the two variables in the exercise, based on their type (quantitative or categorical) and their role (explanatory or response). (e) is the correct answer.

E : 10

✓ Good job! Side-by-side boxplots are the appropriate display for comparing several groups of **quantitative** data (in other words, for displaying the relationship between a **categorical explanatory** variable, in this case "birth order," and a **quantitative response** variable, in this case "IQ score.")

Question (4)

A local ice cream shop kept track of the number of cans of cold soda it sold each day, and the temperature that day, for two months during the summer. The data are displayed in the scatterplot below:



- C:** Positive nonlinear relationship with outlier(s)
D: Negative linear relationship with no outlier(s)
E: Negative nonlinear relationship with outlier(s)
F: Negative nonlinear relationship with no outlier(s)

Feedback

A : 10

- ✓ Good job! The graph displays a positive relationship: an increase in X is associated with an increase in Y. The relationship is linear because it can be described as points scattered about a line. Finally, it has one point that deviates from the pattern of the relationship, which is considered an outlier.

B : 0

- ✗ This is not quite right. While the relationship is positive and linear, it does have one outlier—the point on the lower right that deviates from the pattern of the relationship. (a) is the right answer.

C : 0

- ✗ This is not quite right. While you're correct that the relationship is positive and has an outlier, the relationship is linear, because it can be described as points scattered about a line. (a) is the right answer.

D : 0

- ✗ This is not quite right. While the relationship is linear, it is positive, because an increase in X is associated with an increase in Y. It also does have one outlier—the point on the lower right that deviates from the pattern of the relationship. (a) is the right answer.

E : 0

- ✗ This is not quite right. While you're correct that the relationship has an outlier, it is positive, because an increase in X is associated with an increase in Y, and it is linear, because it can be described as points scattered about a line. (a) is the right answer.

F : 0

X This is not quite right. The graph displays a positive relationship: an increase in X is associated with an increase in Y. The relationship is linear, because it can be described as points scattered about a line. Finally, it has one point that deviates from the pattern of the relationship, which is considered an outlier. (a) is the right answer.

Question (5)

Which of the tables is the appropriate table of conditional percents to discover if the region where one lives affects whether or not one has health insurance?

	Region	Uninsured	Insured	Total
table A	Northeast	12.6%	87.4%	100%
	Midwest	12.0%	88.0%	100%
	South	18.2%	81.8%	100%
	west	17.4%	82.6%	100%
table B	Region	Uninsured	Insured	Total
	Northeast	2.3%	16.2%	18.5%
	Midwest	2.7%	19.6%	22.3%
	South	6.6%	29.5%	36.1%
	West	4.0%	19.1%	23.1%
	Total	15.6%	84.4%	100%
table C	Region	Uninsured	Insured	
	Northeast	15.0%	19.2%	
	Midwest	17.1%	23.3%	
	South	42.1%	35.0%	
	West	25.8%	22.6%	
	Total	100%	100%	

A: table A

B: table B

C: table C

Feedback

A : 10

✓ Good job! This table finds conditional percents for each value of

✓ the explanatory variable (region): northeast, midwest, south, and west.

B : 0

✗ That's not quite right. We need to find the conditional percents for each value of the explanatory variable. (a) is the right answer.

C : 0

✗ That's not quite right. We need to find the conditional percents for each value of the explanatory variable. (a) is the right answer.